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RESEARCH ARTICLE

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Post-Traumatic Stress Disorder and Motor Vehicle Accidents in Tunisian Patients: An Observational Study

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ABSTRACT

Background: Post-traumatic stress disorder (PTSD) remains underestimated and under-investigated by trauma specialists who are more likely to be sought for physical complaints than for emotional distress.

Objectives: This paper aimed at:

- specifying the clinical characteristics of a population of motor vehicle accidents (MVA) survivors.

- determining the prevalence of PTSD and establishing the link between PTSD and emotional, anxious and depressive disorders.

Subjects and Methods: Our study was observational, analytical, and cross-sectional; it investigated 120 MVA survivors, attending the outpatient consultation of the Orthopedics Department in Sfax, Tunisia, and who presented traumata of different degrees of severity. We used the Abbreviated Injury Scale (AIS) to assess the severity of trauma, Post-Traumatic Stress Disorder Checklist Scale (PCL-S) to measure post-traumatic stress and Hospital Anxiety and Depression Scale (HAD) to evaluate anxiety and depression.

Results: The population under study was relatively young, made of male patients mainly, who were from rural areas, and who had a low socio-economic status and who were without medical and surgical antecedents. In this population, prevalence of PTSD was 54.17%. The risk factors to develop PTSD were: female gender, rural area origin, passivity during MVA and disability resulting from exposure to MVA. In terms of comorbidity, anxiety and depression disorders were strongly correlated with PTSD ($p<10-3$).

Conclusion: If physical disability resulting from MVA is clearly observable, the psychiatric sequelae of MVA such as PTSD are rather difficult to assess. Hence, screening tests are required as they may improve clinical management.

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Introduction

Road accidents or motor vehicle accidents (MVA), a significant public health issue, are frequently responsible for human losses and sequelae leading to disability and impaired living conditions among survivors [1-3]. In countries where incomes are average to low, MVA related trauma exposure was 30 to 86%; in MVA victims admitted because of trauma, and up to 48 % in bed-ridden patients in the surgery ward [1]. After the accidents, management of injured MVA survivors started in the Emergency Department where the paramount priority was to salvage and maintain in life the patients. The physical vital signs were checked as a first-line routine. But what about the psychiatric assessment? Psychiatric stress is theoretically involved in the initial assessment but in practice it is sought exceptionally [4]. The first descriptions of psychological problems following traumatic events date back to Antiquity [5]. However, only after the descriptions by Oppenheim of" traumatic neuroses'' which were the results of shock of the body cause by railway accidents, did researchers consider them as pathological and medical. PTSD as a clinical diagnosis and new field of research has evolved in a large part from Vietnam Veterans [6,7].

The objectives of our study were:

- to specify the clinical characteristics of a MVA population
- to determine the prevalence of PTSD in this population
- to establish the link between PTSD and emotional, anxious and depressive disorders.

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Subjects and Methods

Study design

Our study was observational, analytical, cross-sectional and conducted in the outpatient consultation of the Orthopedics Department in the Habib Bourguiba Teaching Hospital, Sfax, Tunisia.

Population studied

Our study included patients who had survived road accidents, and who were followed up at the outpatient consultation of the Orthopedics Department of Sfax and who presented with trauma of varying severity. The study was conducted throughout November 2019.

Inclusion Criteria

The outpatients of the Orthopedics Department of Sfax, Tunisia, who met the criteria below, were included in the study

- being motor vehicle accidents survivors
- giving their informed consent to the interview
- being ≥ 18 of age
- joining the study shortly after the MVA (≥ one month)

Exclusion Criteria

- all types of accidents other than MVA
- the lack of the patients' consent
- being less than 18 years old (≥18)
- period following the accident inferior to one month to rule out patients with acute

stress disorder

- being an MVA survivor with severe head trauma (as cerebral lesions can trigger psychiatric disorders of organic origin and may blur the results)

Measures

For every MVA survivor, sociodemographic, anamnestic and MVA- related data were obtained using structured forms, self-reports and the medical file.

The assessment scales used were:

Abbreviated Injury Scale (AIS) assessment scale evaluating the severity of trauma. Initial lesions of every survivor were coded according to the AIS scale, taking into account the risk of threat to life, speed, complexity and expected length of treatment. This scale was developed to provide researchers with a simple digital method to rank and compare injuries according to their degree of severity and to standardize the terminology used to describe these injuries [8].

Post-Traumatic Stress Disorder Checklist Scale (PCL-S) for the evaluation of PTSD: It is a short, easily administered self-report rating scale for assessing the groups of items corresponding to DSM-IV clusters. The scale is made of seventeen items, evaluating the severity of the seventeen TPSD symptoms-associated with a diagnostic code and measured using a 1-5 scale. The 17 items can be grouped in three underscales corresponding to the main PTSD symptoms. French version has been validated with a normative threshold of 44 in PTSD diagnosis.

Scale of evaluation of both anxiety and depression: we used the Hospital Anxiety and Depression Scale (HAD). It is a tool used to screen anxiety and depression disorders [9,10].

Statistical analysis

For statistical analysis was performed using Statistical Package Sciences version 18.Statistical evaluates performed were student t-test, chi-square test. A p value less than 0.05 was considered statically significant. Logistic regressions were used to identify independent predictors of PTSD after 3 months.

Results

A general descriptive study of the population

Our study investigated 120 MVA survivors, attending the outpatient consultation of the Orthopedics Department in Sfax,

The mean age of the patients was 37.17 years (SD= 13.35) with peaks of 18 to 76 years. The sex ratio (male/female) was 4.45.

On the day of the accident, 53.3% were riding motorbikes/mopeds and 26.7% were car drivers. Among the latter, 12.5% were wearing their seat-belts. Alcohol consumption prior to the accident was noted in 5% of the patients.

Amongst the survivors involved in MVA 34.2% watched others' injuries whereas 6.7 % witnessed fatality. Sixty one per cent of patients were admitted in the Orthopedics Department of Sfax due to post-traumatic disorders after an initial management in the Emergency Department. Fifty four patients sustained functional disability after the accident. Among these, six became disabled due to amputations or crushed limbs.

In the population surveyed, the AIS score (evaluating the severity of injuries) was higher than three in 62.5 %. The mean score of anxiety and depression was respectively 8.76 ± 3.62 and 8 ± 3.65. Anxiety and depression were detected respectively in 27.5 % and in 36.7 % of patients. PTSD was prevalent in 54 % of MVA survivors.

Study of the patients with PTSD

- **Descriptive study**

Characteristics of the sub-population of patients with PTSD

The mean age of the patients belonging to the sub-population category was 36.69 years. They were men in 80% of cases. They were professionally active in 89.23%. After the accident, professional inactivity reached 83.03% in this population.

• Data related to the MVA

Motor vehicles on the day of the occurrence of the MVA were used in 73.83% of cases. Thirty nine per cent were drivers/riders and thirty five per cent were passengers. Witnessing fatality was reported in 6.15 % of the cases.

Sixty per cent of patients had been admitted to the Orthopedic Surgery Department.

Six per cent of patients had permanent disability.

• The established scores

The AIS score showed that 40% had a score greater or equal to three. A depression was found in 60 % of the cases and an anxiety

was reported in 44.62% of the patients interviewed.

The mean score of anxiety and depression in patients with PTSD was respectively 10.74 ± 2.85 and 9.51 ± 3.62.

• Analytical study

Female gender was consistently shown to be a risk factor for the onset of PTSD (p=0.038). Living in a rural area was also associated with PTSD (p=0.021).

Pedestrians as well as passengers accompanying the drivers/ riders had not significantly a higher prevalence of PTSD (p=0.113) and (p=1.000) respectively.

Our study did not reveal any statistically significant association between hospital admission due to the MVA and the onset of PTSD (p=0.830).

Concerning the subsequent factors to MVA, the patients who suffered disability due to an MVA had a significantly higher prevalence of PTSD (p=0.016).

The severity of traumata was not correlated with the onset of PTSD (p=0.53).

PTSD was consistently correlated with the degree of depression (p<10-3) and with the degree of anxiety (p<10-3).

To identify the predictors of PTSD, factors were included in logistic regression. The dependent variable was the development of PTSD after 3 months. Gender was related to the presence of PTSD at 3 months (OR = 10.08, 95% CI = 1.262-80.589, p = 0.029). Anxiety was associated with the presence of PTSD (OR = 0.158, 95% CI = 0.044–0.570, p = 0.005). Also, depression was associated with the presence of PTSD (OR = 0.091, 95% CI = 0.027–0.310, p = 0.000).

Discussion

In our study, prevalence of PTSD in MVA survivors was 54.1%. In the general population, this prevalence has been estimated at 1-8% according to international researchers [11-22]. MVA represent the main causes of PTSD. In the population of MVA survivors, this prevalence varies according to the studies: it ranges from 6.8 to 46 %, as illustrated on Table 1. As shown by the findings, prevalence of PTSD seems to be slightly higher than in the literature. It might be partly explained by the fact that in our study, we used a PTSD screening scale and not a diagnostic scale.

Table1: Prevalence of MVA related PTSD as shown by data from the literature

Author(s) of the study	Study description	Study year	PTSD prevalence
Saberi HR [21]	Iranian study	2013	20%
Iteke [15]	Nigerian study	2011	26,7%
Jomli. R [1]	Tunisian study	2010	16%
Chossegros [12]	French study	2010	18 à 23 %
O'Donnell [18]	_	2010	8 à 46%
Ryb [20]	_	2009	8 à 46%
O'Donnell [19]	_	2008	
Sophie KRIEF [16]	French study	2007	6,8%
Seethalakshmi R. [22]	Hindu study	2006	8,5 à 39%
Ducrocq. F [13]	_	2006	20 à 40 %
Breslau N [11]	A systematic review	2002	15 à 45 %
Murray J [17]	Oxford study	2002	19%
Holeva V[14]	Manchester study	2001	23%

MVA: Motor Vehicle Accidents **PTSD:** Post-Traumatic Stress Disorder

Witnessing fatality was reported in 6.15 % of the cases. In fact, studies have reported that patients exposed to the death of others during the accident are at a heightened risk for developing PTSD. If the deceased person were a relative, additional issues besides the process of mourning might be present during the treatment: enhanced perceptions of responsibility, protracted feeling of guilt and survivor's guilt thus, the fact of witnessing the death of a third person brings the issue of our personal death [23].

Our study did not reveal any statistically significant association between hospital admission due to the MVA and the onset of PTSD (p=0.83). Our findings are in agreement with those of the Tunisian study conducted at the Kassab Institute which stated that the patients felt more or less secure within the hospital and believed firmly that everything would be better after the intervention and few rehabilitation sessions and that the real difficulties started when they are discharged, a time when stressors aggregate. In the literature, the authors tended to agree on the fact that hospital admission after MVA increased stress as experienced by patients. Tan et al found that the MVA consequences had an impact on the individual's life especially when the injuries are serious and require hospital admission[2, 3, 24].

We concluded that there was a statistically significant association between the disability resulting from the accident and the onset of PTSD (p=0.013). A Tunisian study found that facing up to daily life was the most difficult issue. So far, patients had not had to deal with it as they were hospitalized. Indeed, the accident dramatically puts the survivor in a dependence state, forcing him to adjust most rapidly to the modifications in a number of functions. These changes, directly inscribed in the body, cause a deep identity change. Since our psyche underpins, early from birth, on the body, its sensations and its integrity [25].Thus, the fissure in the body envelope leads to a similar fissure in the self since the self when deprived of its structural equipment reveals several deficiencies. It is no longer able to fulfill its role as a borderline between internal reality and external reality. Loss of identity and absence of body image make the recent trauma victim a subject with unreliable psychiatric limits and therefore confronted to a situation close to psychotic states.

More than half of the patients studied had an AIS score smaller than three. In our study, the severity of traumata was not correlated with the onset of PTSD (p=0.53). As a matter of fact, it has been established that the psychiatric and social sequelae of traumata resulting from MVA are not always proportional to the severity of the injuries: even minor traumata can have profound psychosocial outcomes and vice versa. Similar results have been reported in the literature [13]. However, other authors with a particular attention addressed correlations between physical status and psychological status in the aftermath of trauma and PTSD. Gabert-Quillen et al. explained these results by description subjective severity that is severity perceived by the patient himself. This notion has been linked to the onset of PTSD [19-27].

In our series, depression was consistently associated with the onset of PTSD (p=0.000). As stated in some studies, major depression is likely to be the comorbid psychological problem to be particularly associated with PTSD. Shalev et al. reported that the co-occurrence of PTSD and major depression cannot be the result of a mere coincidence. The rates of co-occurrence of PTSD and major depression were particularly higher in some studies: 20 to 61%. Some hypotheses have been put forward to explain this finding: PTSD brings about a secondary depressive syndrome mainly in its chronic course and could be a vulnerability source [28-33]. Therefore, when depression complicates the evolution process of PTSD, it further alters the life quality of MVA survivors [35]. The situation worsens in case of severe depression associated with suicidal behavior. Constant reported that PTSD is an anxiety disorder most associated with suicidal behaviour. Indeed, several studies have looked into the links existing between PTSD and suicidal behaviour [29, 37, 38].

We also found a strong association between anxiety and PTSD (p=0.000).It has been ascertained that anxious symptomatic pictures can occur or be re-activated following a traumatic situation either a PTSD or separately. They can take different shapes: generalized anxiety, acute anxiety attacks, or again phobic disorders. In fact, if anxiety disorders occur only in the presence of elements reminding the MVA survivors of the traumatic event, they are considered as part of PTSD [39]. If on the contrary, these anxiety disorders are triggered by a traumatic event and in the absence of criteria required for the diagnosis of PTSD, a causal inference of the link between the traumatic situation and these disorders could be made [39].Finally, we have witnessed a progressive differentiation of PTSD symptomatology and superseding anxiety disorders the link of which with the traumatic event is no longer immediately discernible [40]. The prevalence of chronic anxiety disorders (15-20%) reported several years after a traumatic event evidenced the process [34].

When preparing this article, there were particular limitations. Indeed, the number of the cases was relatively small. Besides, the patient attending the Orthopedics Department after an MVA is not necessarily representative of the population of MVA survivors in Tunisia. Finally, all the scales used were not validated for the Tunisian population.

Conclusion

This study was meant to be a step towards improvement in management of MVA survivors, since a robust screening allows for subsequent more effective targeted interventions aimed at alleviating PTSD effects and better health outcomes. It is mandatory to make room again for listening, speech and doctor-patient relationship. The set of partners-the attending physician being one of them- should be capable of singling out and orienting patients with or likely to have the pathology in order to set up treatments whose effectiveness has been proven and to avoid the noxious effects of the disease that involve not only the patient but also his entourage.

The latter can play an important part in the disorder development while being at the immediate front-line to provide vital moral support as clearly ascertained in the literature where it has been admitted that the MVA survivor possesses an individual potential and can be helped by environmental conditions to overcome the psycho-traumatic sequelae of the accident. In fine, the government policy should focus on first improving road construction standards to avert preventable traffic accidents and then better management of MVA victims who besides their physical and psychological pain have to sustain heavy health fees and are charged at peak rate because of MVA.

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